FURTHER NOTES ON IRIS ORATORIA IN CALIFORNIA

(Orthoptera:Mantidae)

ASHLEY B. GURNEY

Entomology Research Branch, Agricultural Research Service, United States Department of Agriculture, Washington, D. C.

Iris oratoria (Linnaeus), a distinctive mantid native to the Mediterranean area, has recently been recorded from California by Strohecker (1952), who stated that the identification was made by B. P. Uvarov. Strohecker's collection records date from 1940 and represent Fresno, Kern, Riverside, and Imperial Counties.

The present paper reports a 1937 record for this species and supplies additional information on distribution and recognition characters likely to be helpful to American students. For the records here reported and for other data I am grateful to John N. Belkin, of the University of California at Los Angeles, and to the collectors named below who cooperated with Dr. Belkin in making this information available.

New records for *Iris oratoria* (L.) from Riverside and Imperial Counties, California, based on specimens seen by Dr. Belkin except for the one collected by Dr. Tinkham, are as follows:

Coachella Valley, October, 1937 (R. B. Cowles), 1 male (U.C.L.A.); Indian Wells, October 4, 1952, at light (R. X. Schick), 2 males (U.C.L.A. and U.S.N.M.); same, April 24–25, 1953 (R. H. Orson), 1 female (U.S.N.M.); Indio, October 15, 1951 (L. D. Anderson), 1 female (Citrus Expt. Sta.): same, April 24, 1953 (W. A. McDonald), 1 male (U.C.L.A.); same, May 3, 1953 (E. R. Tinkham), 1 male (used by Paramount Studios); 3 miles west of Cabazon, October 22, 24, 1952 (E. G. Linsley, et al), 2 females (Citrus Expt. Sta.); El Centro, September 3, 1952 (H. T. Reynolds), 1 female (U.C.L.A.).

Dr. Belkin has observed at Riverside, a caged female which had been swept from cotton at El Centro, Imperial County, by H. T. Reynolds on September 3, 1952. While in captivity this female laid at least 10 egg masses. She died December 1 and was preserved (U.C.L.A.). Mantids presumed to be *Iris* were reported by Dr. Reynolds to be common in the cotton fields of Imperial County. In addition to the above specimens, the Los Angeles County Museum has a female collected by Dr. J. A. Comstock in 1933 which, according to Dr. Belkin, is definitely this species though in poor condition. The exact date of collection cannot be determined, nor the locality, but Dr. Belkin has checked certain museum accession entries which attest to the correctness of the 1933 date.

Iris oratoria is widespread in the Mediterranean countries. Beier (1935:107) listed northwest Africa, Spain, southern France, Sardinia, Sicily, Greece, and Asia-Minor. Ramme (1951) specified the Balkans, Macedonia, Anatolia, and Syria. Linnaeus (1758:426) originally described this insect from material collected by E. Brander in Africa. Subsequently Uvarov (1923) has pointed out that since Brander was a Swedish Consul stationed at Algiers, this locality may be interpreted as the type locality.

It is well known that the egg cases (oöthecae) of mantid species frequently are carried accidentally in commerce. Therefore, certain introductions probably have been made by this means, and it appears likely that *Iris oratoria* was introduced into the United States in this manner. Several examples of Old World insects, which have been established in California since the advent of widespread air travel, suggest the increased ease with which introductions may occur. Strohecker *(op. cit.)* records a small Palearctic katydid, *Phaneroptera quadripunctata* Brunner, from central and south-central California, and in 1950 I recorded *Euborellia cincticollis* (Gerstaecker), a west African earwig, from southern California (Gurney, 1950).

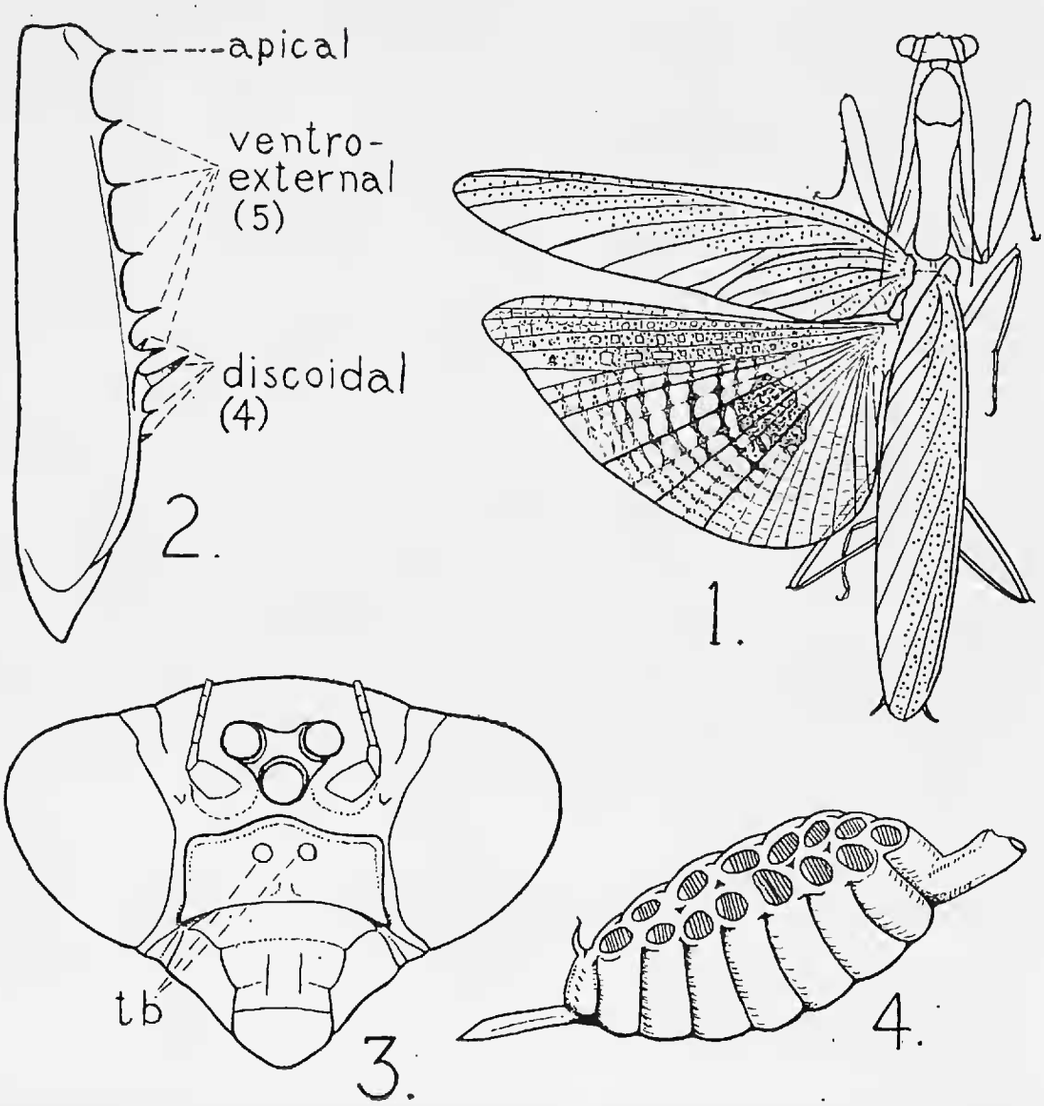
The features illustrated (figs. 1–3) distinguish this mantid from other North American species, especially the nature of the facial shield, the five ventro-external spines on the front femur (instead of four as in *Stagmomantis),* and the color pattern of the hind wing. The males of the minor mantid *Litaneutria minor* (Scudder) frequently have a blackish-violet spot on the wing (Gurney, 1951, pl. 5, fig. 2), somewhat suggesting the one occurring in *oratoria,* but *Litaneutria* may be distinguished by the narrower head, the more delicate general structure, and the decidedly brachypterous females, in addition to the lack of tubercles on the facial shield and the presence of only four ventro-external spines on the front femur.

For a key to the five genera of Mantidae previously known from the Southwest, students are referred to Ball, Tinkham, et al (1942:268). A key to the world genera of Mantinae is presented by Beier (1935), who attached much importance to the presence in *Iris* of five ventro-external spines on the front femur. The species of *Iris* were reviewed by Uvarov (1931), and several forms have been described since that time, bringing the total species and sub-

species listed by Beier (1935) to 14, of which several are of uncertain status.

A brief description of *Iris oratoria* is as follows:

Male.—Eyes broadly rounded (fig. 3); ocelli prominent, each ocellus distinctly circular rather than elliptical; facial shield slightly more than twice as broad as high, the upper margin distinctly marginate, the median third of upper margin broadly convex, a pair of short blunt tubercles on disc of shield slightly above middle and somewhat closer to each other than to respective ends of shield, a moderately sharp tubercle at each latero-anterior angle of shield; antennae filiform, reaching about to base of abdomen. *Pronotum* four times as long as greatest width, margins smooth except for traces of denticulation along anterior third. Front tibia lacking dorsal spines; ventro-external margin of front femur with five strong spines in



EXPLANATION OF FIGURES

Figs. 1–3, *Iris oratoria* (L.), male from Indian Wells, Calif. 1. Habitus, with opaque area of tegmen and brick-red area of radial field of wing shown stippled; 2. External face of front femur; 3. Head. Fig. 4, Egg mass of *oratoria*, redrawn from Morales. *tb*—median tubercles of facial shield.

addition to an apical one (fig. 2); middle and hind femora unarmed except for a single slender genicular spine each on the cephalic side. *Tegmen* (fig. 1) about four times as long as maximum width, apex narrowly rounded, the costal half opaque, posterior half transparent, reaching about to or somewhat surpassing apex of abdomen, the costal margin lacking cilia. Wing with much of basal two-thirds of radial field dull brick red, with small transparent windows in the middle of many cells; anal field with irregular shining bluish-black blotch about as broad as the width of the head located at a distance from the base about equal to a third the wing length; apical half of anal field yellowish, with concentric blackish fasciae.

Female.— Averaging somewhat more robust than male. Head differs from male mainly in the smaller, scarcely protuberent ocelli, separated from each other by nearly twice the diameter of one ocellus; pronotum averaging stouter and the marginal denticulation more developed; tegmina shorter than abdomen, usually covering one-half to threee-fourths of abdomen, apex broadly rounded; hind wing subquadrate, marked as in male.

Habitus illustrations of males are given by Chopard (1947, pl. 3, color) and Morales (1947), of females by Beier (1935, pl. 4, color), Chopard (1951), and Morales (1947).

I have seen only three California specimens of *Iris oratoria*, a male from Coachella Valley and a pair from Indian Wells. These specimens are larger than most published size records for *oratoria*. It may be observed that Uvarov (1923:60) pointed out that specimens from the eastern Mediterranean area seem larger and more heavily marked on the wings than others. This fact suggests that if the size in the California population proves to be consistently large then this population may be related to the particular population from which the introduced stock originated.

Four males and two females, from Coachella Valley, Indian Wells, El Centro, and Indio, measured by Dr. Belkin or myself, have the following size ranges (length in millimeters): (Males) Body, 51–53, average 52.2; pronotum, 13–15.5, average 14.4; tegmen, 31.5–34, average 32.6. (Females) Body 52–53, average 52.5; pronotum, 16–16, average 16; tegmen, 22–22, average 22. Chopard (1943, 1951, and other papers) gives the following respective ranges for the same measurements: (Males) 28–37, 8–11.5, and 22.3; (Females) 34–47, 11–16, and 15–22. The same measurements given by Giglio-Tos (1927) for males (27–46; 8–14.5; 22–35) have greater maximum extremes than those of Chopard and more nearly agree with the California specimens, but the size extremes given by him for females are not as broad as those of Chopard.

The cerci of the male deposited in the U. S. National Museum have at least 12 segments. Uvarov (1923:62, fig. 1) has described and figured males of *oratoria* with nine-segmented cerci. A female examined has at least 11 segments, and it is evident that the segmentation is less clearly indicated toward the base of the cercus than in the apical half. This apparent discrepancy, the unusually large size of the specimens measured, and apparent differences in egg masses should alert entomologists to the possibility that further studies may show the California population to be distinct from typical *oratoria*.

The biology of *Iris oratoria* is apparently typical of mantids living under temperate conditions, with a winter diapause passed in the egg stage, unlike the related *I. deserti* Uvarov of the North African deserts, which according to Karsakoff (1934) has a diapause in the nymphal condition.

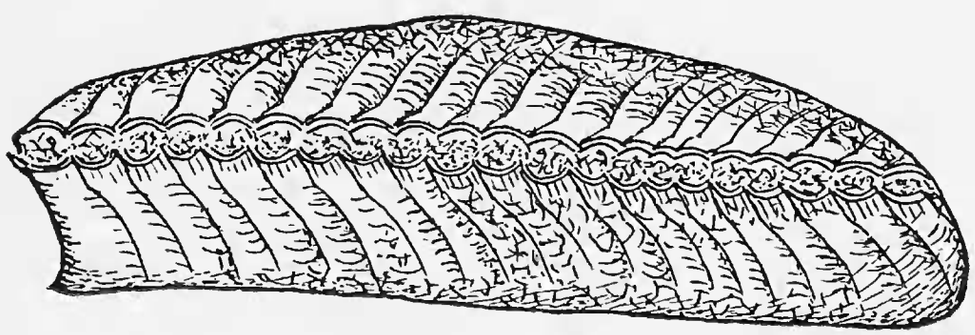


Fig. 5, Oötheca of *Iris* from California, dorsolateral view. Length, 20 millimeters.

Old World examples of the oöthecae of *oratoria* have been illustrated by Chopard (1938, fig. 197) and Morales (1947, fig. 40), and Morales' figure is here shown (fig. 4). Oöthecae from California have a different appearance (fig. 5), however. The most noticeable difference is a distinctive emergence groove. Three Californian oöthecae examined are 10, 16, and 20 millimeters long, respectively, and are 6 to 7 mm. wide at the base and about 5 mm. high. There are about 6 longitudinal rows of eggs, 3 on each side slanting inward and upward toward the emergence groove. Individual eggs in the outer row give a convex appearance when not covered by dried "froth". The emergence groove is formed by a brief projection of parchment-like material lining each side of the passageway where each set of approximately six nymphs work their way to the surfacc. The groove is loosely filled with dried

"froth". The number of eggs per longitudinal row is 10, 15, and 20, respectively, in the oöthecae examined; the total number of eggs thus varies from about 60 to 120.

REFERENCES

Ball, E. D., E. R. Tinkham, et al

1942. The grasshoppers and other Orthoptera of Arizona. Ariz. Agri. Expt. Sta. Tech Bull. 93:257–373, 4 pls., 11 figs.

Beier, Max

1935. Mantinae. Gen. Insectorum, fasc. 203:1–146, 8 pls.

Chopard, Lucien

1938. La Biologie des Orthopteres. Encycl. Ent. 20:1–541, 3 pls., 453 figs.

1943. Orthopteroides de l'Afrique du Nord. Faune de l'Empire Francais I:1–447, 658 figs.

1947. Atlas des Apterygotes et Orthopteroides de France. Nouvel Atlas d'Entomologie 2:1–111, 12 pls., 12 figs.

1951. Orthopteroides. Faune de France 56:1–359, 531 figs.

Giglio-Tos, E.

1927. Orthoptera, Mantidae. Das Tierreich, Lief. 50:1–707.

Gurney, Ashley B.

1950. An African earwig new to the United States, and a corrected list of the Nearctic Dermaptera. Proc. Ent. Soc. Wash. 52:200–203.

1951. Praying mantids of the United States: Native and introduced. Smithsonian Ann. Rept. for 1950: 339–362, 9 pls.

Linnaeus, Carolus

1758. Systema Naturae, Ed. 10:1–823.

Karsakoff, M.

1935. Quelques observations sur une nouvelle mante du Sud-Algerien; *Iris deserti* Uv. Ann. Soc. Linn. Lyon 78 (N. S.):161–170, 6 figs.

Morales, Agacino, E.

1947. Mántidos de la fauna ibérica. Est. Fitopath. Agric. Madrid, Trab. 184:1–34, 44 figs.

Ramme, W.

1951. Zur systematik faunistik und biologie der Orthopteren von Südost-Europa und Vorderasien. Mit. Zool. Mus. Berlin 27:1–431, 39 pls., 134 figs.

Strohecker, H. F.

1952. Two Palearctic Orthoptera established in the United States. Pan-Pac. Ent. 28:138.

Uvarov, B. P.

1923. Records and descriptions of Orthoptera from Northwest Africa. Novitates Zoologicae, Tring 30:59–78, 2 figs., 1 pl.

1931. Notes on the genus *Iris*, Saussure. Ann. Mag. Nat. Hist. 8 (Ser. 10): 234–238, 1 pl.